

10-05-04

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Application of:

Yossi SHACHAM-DIAMAND, et al.

Serial No.: 10/750,716

Filed: January 2, 2004

For: COPPER MOLYBDENUM  
ELECTROLESS DEPOSITION PROCESS  
AND MATERIALS

) Art Unit: 1742  
)  
) Examiner: (N/A)  
)  
) Washington, D.C.  
)  
) October 4, 2004  
)  
) Docket No.: 206,407

INFORMATION DISCLOSURE STATEMENT [IDS]

Commissioner for Patents  
P.O. Box 1450  
Alexandria, Va. 22313-1450

Sir:

This Information Disclosure Statement is submitted in accordance with 37 C.F.R. 1.97, 1.98, and it is requested that the information set forth in this statement and in the listed documents be considered during the pendency of the above-identified application, and any other application relying on the filing date of the above-identified application or cross-referencing it as a related application.

☒ 1. This IDS should be considered, in accordance with 37 C.F.R. 1.97, as it is filed:

(Check one of the boxes A-D)

☐ A. within three months of the filing date of the above-identified national application or within three months of the entry into the national stage of the above-identified international application.

☒ B. before the mailing date of a first office action on the merits.

☐ C. after (A) and (B) above, but before final rejection or allowance, and Applicants have made the necessary certification (box "i" below) or paid the necessary fee (box "ii" below).

(check one of the boxes "i" and "ii" below:)

☐ i. Counsel certifies that, upon information and belief, each item of information listed herein was either (a) cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this IDS; or (b) was not cited in a communication from a foreign patent office in a counterpart foreign application and, to the knowledge of undersigned after making reasonable inquiry, was not known to any individual designated in 1.56(c) more than three months prior to the filing of this IDS.

☐ ii. A check for the fee set forth in 1.17(p), presently believed to be \$240, is enclosed (check no. \_\_\_\_\_).

☐ D. after (A), (B) and (C) above, but before payment of the issue fee: Applicant petitions under 37 C.F.R. 1.97(d) for the consideration of this IDS. A check for the fee set forth in §1.17(i), presently believed to be \$130 is enclosed (check no. \_\_\_\_\_). Counsel certifies that, upon information and belief, each item of information listed herein was either (i) cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the IDS; or (ii) was not cited in a communication from a foreign patent office in a counterpart foreign application and, to the knowledge of the undersigned after making reasonable inquiry, was not known to any individual designated in 1.56(c) more than three months prior to the filing of this IDS.

☒ 2. In accordance with 37 C.F.R. 1.98, this IDS includes a list (e.g., form PTO-1449) of all patents, publications, or other information submitted for consideration by the office, either incorporated into this IDS or as an attachment hereto. A copy of each document listed is attached, except as explained below.

(check boxes A and/or B and fill in blanks, if appropriate.)

☐ A. Document(s) \_\_\_\_\_ is (are) deemed substantially cumulative to document(s) \_\_\_\_\_, and, in accordance with 1.98(c), only a copy of each of the latter documents is enclosed.

☐ B. Certain documents were previously cited by or submitted to the Office in the following prior application(s), which are relied upon under 35 U.S.C. 120:

[insert serial numbers and filing dates of prior applications]

Applicant identifies these documents by attaching hereto copies of the forms PTO-892 and PTO-1449 from the files of the prior application(s) or a fresh PTO-1449 listing these documents, and request that they be considered and made of record in accordance with 1.98(d). Per 37 CFR 1.98(d), copies of these documents need not be filed in this application.

☐ 3. Documents \_\_\_\_ is (are) not in the English language. In accordance with 1.98(c), Applicant states:

☐ An English translation of each document \_\_\_\_\_ (or of the pertinent portions thereof), or a copy of each corresponding English-language patent or application, or English-language abstract (or claim) is enclosed.

☐ A concise explanation of the relevance of document(s) \_\_\_\_\_ is found in the attached search report (see reply to Comment 68 in the preamble to the final rules; 1135 OG 13 at 20).

☐ A concise explanation of the relevance of document(s) \_\_\_\_\_ is set forth as follows:  
[Insert concise explanation of relevance]

☐ A concise explanation of the relevance of document(s) \_\_\_\_\_ can be found on page(s) \_\_\_\_\_ of the specification.

☐ A concise explanation of document(s) \_\_\_\_\_ can be found on the attached sheet.

4. No explanation of relevance is necessary for documents in the English language (see reply to Comments 67 and 68 in the preamble to the final rules; 1135 OG 13 at 20).

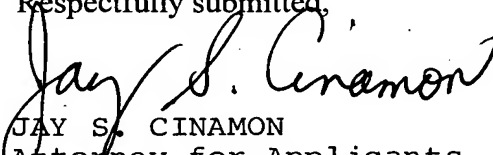
☐ 5. Other information being provided for the examiner's consideration follows:

6. In accordance with 37 C.F.R. 1.97(g) and (h), the filing of this IDS should not be construed as a representation that a search has been made or that information cited is, or is considered to be, material to patentability as defined in §1.56 (b), or that any cited document listed or attached is (or constitutes) prior art. Unless otherwise indicated, the date of publication indicated for an item is taken from the face of the item and Applicant reserves the right to prove that the date of publication is in fact different.


**CROSS REFERENCE UNDER 37 C.F.R. §1.78 TO RELATED APPLICATIONS**

Pursuant to 37 C.F.R. § 1.78, Applicant notes that the above-identified patent application may be related to the following U.S. Patent Applications:

Respectfully submitted,

  
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FORM PTO-1449 (Colb)	ATTY DOCKET NO. 206,407	SERIAL NUMBER 10/750,716
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANTS' INFORMATION STATEMENT	APPLICANT Yossi SHACHAM-DIAMAND et al.	EXAMINER (N/A)
	FILING DATE January 2, 2004	GROUP ART UNIT 1742

## U.S. PATENT DOCUMENTS

Examiner's Initials		DOCUMENT NO.	DATE	NAME	CLASS	SUB	FILING DATE
	AA	5,695,810	12-1997	Dubin, et al.			
	AB	5,674,787	10-1997	Zhao, et al.			
	AC	4,209,331	06-1980	Kukanskis, et al.			
	AD	4,150,171	04-1979	Feldstein			

## FOREIGN PATENT DOCUMENTS

		DOCUMENT NO.	DATE	COUNTRY	CLASS	SUB	TRANS- LATION
	AE						
	AF						

## OTHER ART (Including Author, Bills, Pertinent Pages, Etc.)

AG	<b>P.C. Andricacos</b> , Damascene Copper Electroplating for Chip Interconnect, IBM J. Res. Develop 42 (1998) 567-573.
AH	<b>Y. Shacham-Diamand, V. Dubin, and M. Angyal</b> , Copper Electroless deposition for ULSI, Thin Solid Films, 262, (1995) 93-103.
AI	<b>Vashkjalis A., Demontaine O.</b> Study of Cu electroless deposition process using NaBH <sub>4</sub> as a reducing agent, Lithuanian Academy of Sciences publication, series B, Vol. 4(95), pp.11-16, 1976.
AJ	<b>Molenaar A.</b> , J. of the Electrochem. Soc., 1982 Vol. 129, N 9, p.1917-1921.
AK	<b>Shalkauskas M., Vashkjalis A.</b> Electroless deposition of metals on plastics, L., J. Chemistry, 1985, pp. 95-113.
AL	<b>Tetsuya Ogura, M. Malcomson, Q. Fernando</b> , Mechanism of Copper Deposition in Electroless plating, Langmuir 1990, 6, pp.1709-1710.

EXAMINER:

DATE CONSIDERED:

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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	AF						

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AG	<b>F.P. Pearlstein and R.F. Weightman</b> , Electroless Deposition of Silver Using Dimethylamine Borane, Plating, February 1974, pp.154-157.
AH	<b>Y. Shacham-Diamand, and V. Dubin</b> , J. of Microelectronics Engineering, 33, pp. 47-58, 97.
AI	<b>Yosi Shacham-Diamand and Sergey Lopatin</b> , Journal of Microelectronics Engineering, Vol. 37/38, pp. 77-88, 1997.
AJ	<b>E. Gileadi</b> , Electrode Kinetics, VCH Publishers, New York 1993.
AK	<b>E. Podlaha and D. Landolt</b> , A Mathematical Model Describing the Electrodeposition of Ni-Mo Alloys, J. of the Electrochem. Soc., Vol. 143, pp.893-899, 1996.
AL	<b>E. Podlaha and D. Landolt</b> , Molybdenum Alloys with Nickel, Cobalt and Iron, J. of the Electrochem. Soc., Vol. 144, pp.1672-1680, 1997.

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AE	<b>E. Podlaha and D. Landolt</b> , An Experimental Investigation of Ni-Mo Alloys, J. of the Electrochem. Soc., Vol. 143, pp. 885-892, 1996.
AF	<b>Y.Shacham-Diamand and Y.Sverdlov</b> , Electroless Cu alloys for ULSI applications, in Proceedings of the Advanced Metallization Conference 2001 (AMC 2001), p.67-72, <i>Montreal, Canada</i> , 8-11 October 2001.
AG	<b>Y.Shacham-Diamand, A.Inberg, Y.Sverdlov and N.Croitoru</b> , Electroless Silver and Silver with Tungsten Thin Films for Microelectronics and Microelectromechanical System Applications, J.of the Electrochemical Society, 147 (9) 3345-3349 (2000).
AH	<b>K.M. Gorbunova, A.A. Nikiforova, G.A. Sadakov, V.P. Moiseev, M.V. Ivanov</b> , "Physical-chemical origins of chemical cobalt deposition", "Science" publication, Moscow, pp.195-201, 1974.
AI	<b>F.Ajogin, M.Belenki, I.Gall</b> , "Galvanotechnology", "Metallurgy" publication, Moscow, pp.170-178, 538-540, 1987.
AJ	<b>Y.Shacham-Diamand, A.Inberg, Y.Sverdlov, V.Bogush, N.Croitoru, H.Moscovich, A.Freeman</b> , Electroless process for micro-and nanoelectronics, J.Electrochimica Acta 48 (2003) 2987-2996.

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